ANNUAL REPORT V
OF THE
CONTINUING SURFACE WATER QUALITY
MONITORING PROGRAM
FOR THE PALMER RANCH
DECEMBER, 1989
SARASOTA COUNTY, FLORIDA

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Submitted To:

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ANNUAL REPORT V OF THE
CONTINUING SURFACE WATER QUALITY MONITORING PROGRAM
THE PALMER RANCH
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1.0 INTRODUCTION

A master development plan for the North Tract of the Palmer Ranch is being implemented pursuant to the terms and conditions of the Master Development Order (MDO) which was adopted on December 24, 1984 by the Board of County Commissioners of Sarasota County. The MDO calls for planning and developing the 5,119-acre North Tract of the Palmer Ranch in incremental developments. Construction of the first incremental development (Prestancia) was initiated in 1986 and involved the realignment of various streams flowing through the property. As shown in Figure 1, the North Tract of the Palmer Ranch is located in west-central Sarasota County.

Pursuant to the conditions of the MDO, a "Continuing Surface Water Quality Monitoring Program" is required to be performed prior to and during construction of the North Tract except during periods approved by the County, e.g. during the period in which the "Storm Event Monitoring Program" is being performed as specified in the Agreement of Understanding between Sarasota County and Palmer Venture established during August 1987.

Annual reports of the surface water quality monitoring program are required to be provided to the Sarasota County Planning Department, the Southwest Florida Regional Planning Council, the Florida Bureau of Land and Water Management, and all affected

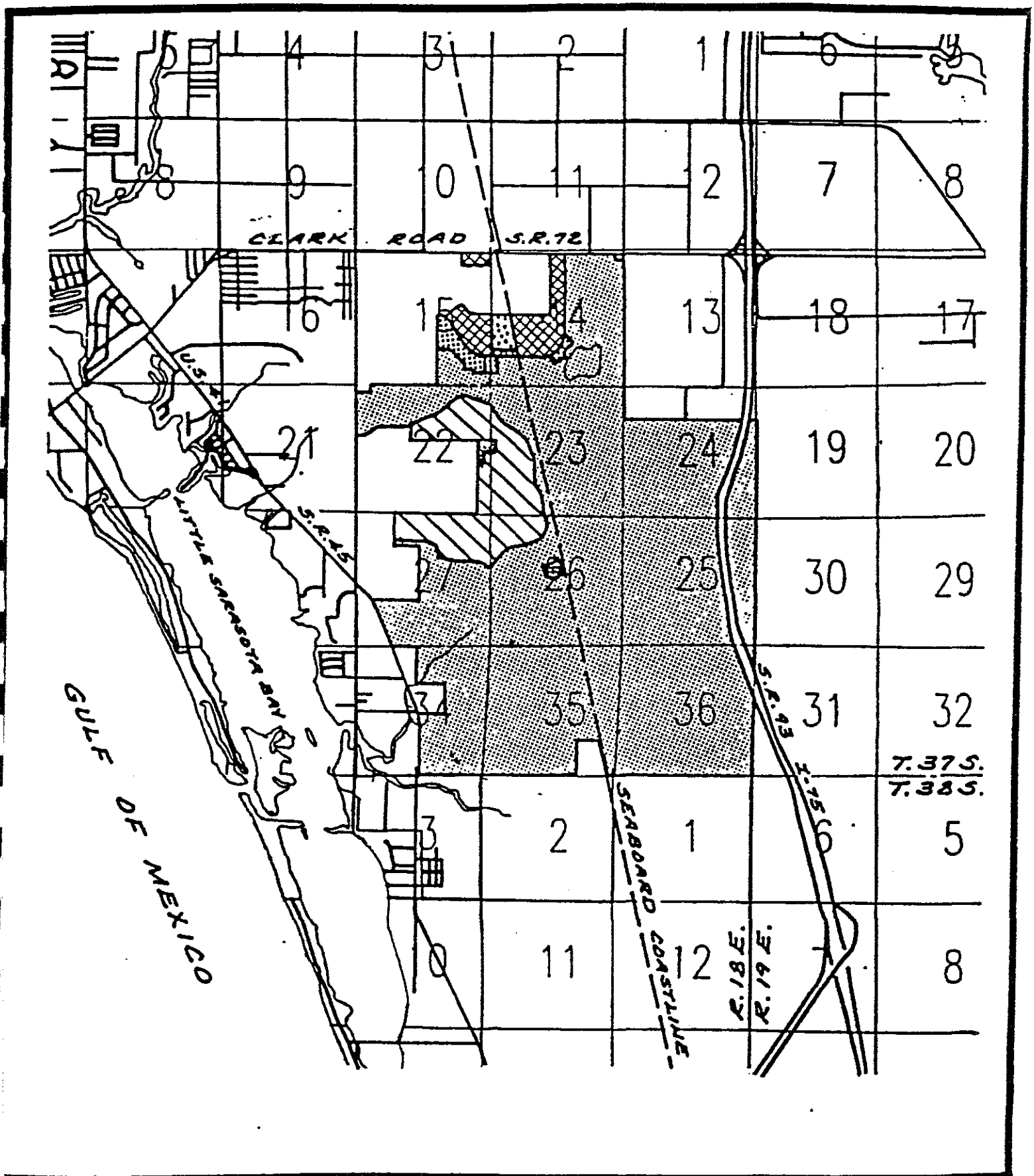

FIGURE 1

GENERAL SITE LOCATION

permitting agencies pursuant to the requirements of Chapter 380.06(14) and (16), Florida Statutes, Chapter 9B-16.25, Florida Administrative Code, and procedures established by the Southwest Florida Regional Planning Council.

The primary purpose of the required "Continuing Surface Water Quality Monitoring Program" is to provide a continual assessment of the surface water quality conditions prior to and during the construction activities on the North Tract of the Palmer Ranch.

The monitoring program which was initiated in May 1984 by GeoScience, Inc. employed a bimonthly sampling frequency as required for the first year of monitoring. Subsequently, the scope of the monitoring program for the following two-year period was revised during an agency review meeting in June 1985. The meeting involved the developer's representative, Mr. T. W. Goodell, and Mr. Russ Klier of Sarasota County Pollution Control Division (personal communication with Mr. T. W. Goodell). The revised workscope entailed a 13 station network with a quarterly sampling frequency for the parameters monitored during the first year except trace elements and organochlorine pesticides which would receive annual audits (refer to correspondence of Mr. T. W. Goodell to Mr. Russ Klier of July 24, 1986).

Palmer Venture contracted Conservation Consultants, Inc. (CCI) to carry out the Continuing Surface Water Quality Monitoring Program beginning during the second year of the monitoring program. CCI began monitoring on September 16, 1985, pursuant to the instructions provided by Palmer Venture. Except for an annual sampling event conducted in September, 1988, the Continuing Surface Water Quality

Monitoring Program was suspended in June, 1988, due to the initiation of the Storm Event Monitoring Program. Subsequent to an agreement between the Sarasota County Pollution Control Division and Palmer Venture, the continuing Surface Water Quality Monitoring Program was resumed in December, 1989 with a single annual sampling event. The water quality conditions observed during the annual sampling event conducted during the period of December 5 and 6, 1989 are reported herein. The report includes a discussion of the results with respect to applicable water quality criteria, observed spatial trends, and comparisons with results obtained during previous monitoring events.

2.0 FIELD AND LABORATORY PROCEDURES

2.1 Station Locations and General Descriptions

The Continuing Surface Water Quality Monitoring Program employs a network of 13 sampling stations located at various sites along South Creek, Catfish Creek, Elligraw Bayou, and Trunk Ditch (Figure 2). A general description of the characteristics of the 13 sampling stations. is provided in Table 1.

South Creek is monitored at five locations. These included two points of inflow (SC-3 and SC-7) as well as one point of outflow from the North Tract (SC-2). One point of inflow, Station SC-7, is located downstream of I-75 and a dairy farm which was been converted to a sod farm. The other point of inflow, Station SC-3, is located down-stream of a mobile home park and golf course. South Creek was also monitored in

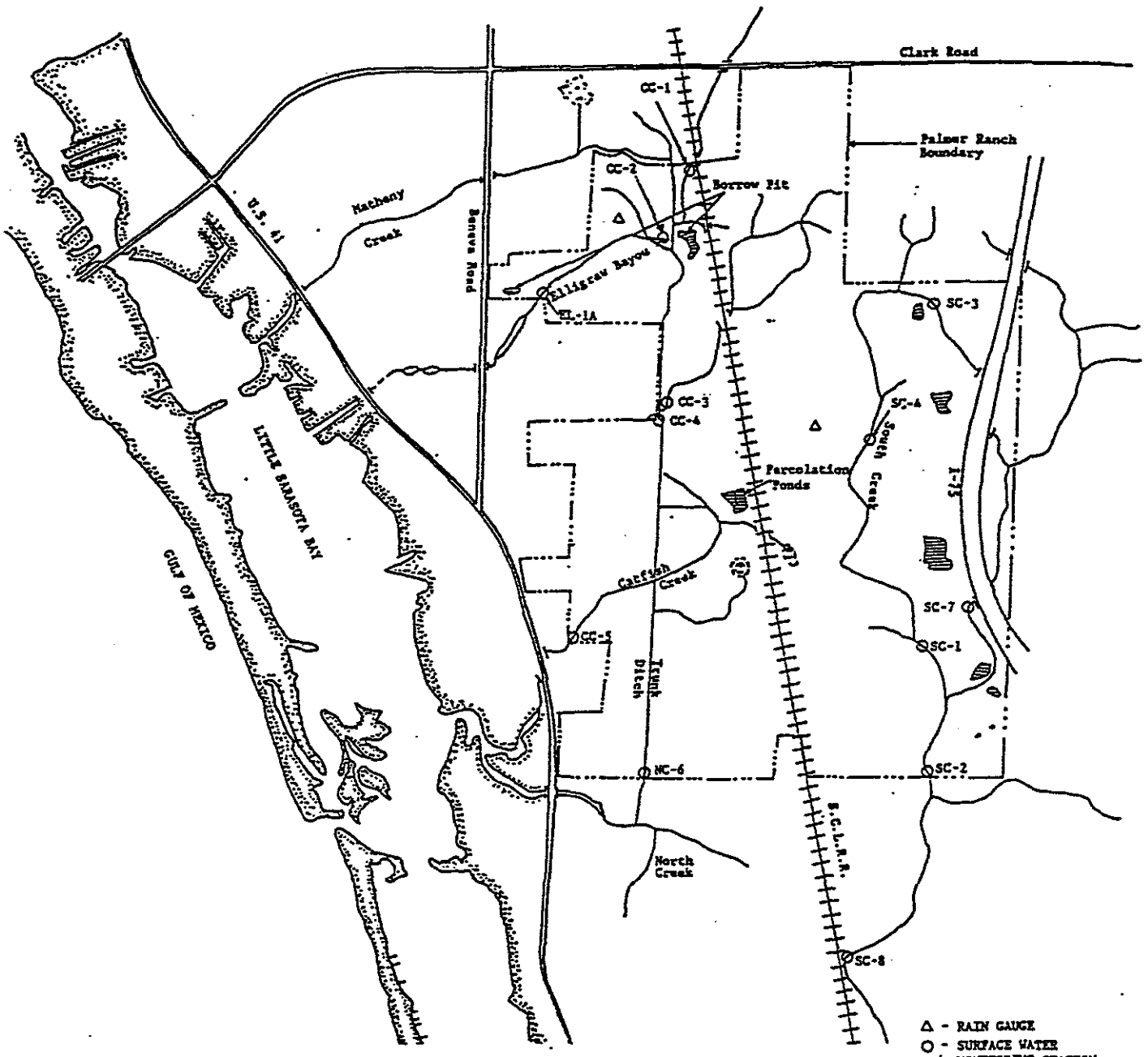

FIGURE 2
LOCATIONS OF MONITORING STATIONS AND RAIN GAUGES

TABLE 1. GENERAL DESCRIPTIVE CHARACTERISTICS OF SURFACE WATER QUALITY SAMPLING STATIONS.

Station	General Location	Water Depth (ft)[a]	Channel Width (ft)	Habitat
CC-1	Catfish Creek Site Entry	1.0-1.6	10	75-100% Canopy of Salix, Rooted Emergents, Incised Banks.
CC-2	Catfish Creek Upstream of Trunk Ditch	0.0-0.45	12	Aquatic Vegetation, Shallow Sloped Banks.
CC-3	Catfish Creek Upstream of Trunk Ditch	0.3-0.6	6	Aquatic Vegetation, Incised Banks.
CC-4[b]	Trunk Ditch Downstream of Catfish Creek Confluence	0.6-2.2	50	Sodded Banks, Rooted Emergents.
CC-5	Catfish Creek Outfall from Site	0.3-0.8	50	Shading in A.M. and P.M. by Oaks, Willows, and Wax Myrtle, Sodded Banks.
NC-6	Trunk Ditch Downstream of Catfish Creek	1.7-2.7	12	Aquatic Vegetation.
El-1	Elligraw Bayou near Site Exit	0.4-0.6	6	Aquatic Vegetation.
SC-1	South Creek Mid-property	0.6-0.7	12	Sand covered with Organic Matter.
SC-2	South Creek at Site Exit	0.5-1.2	17	Rooted Emergents, Floating Aquatics, Palm Trees Shade Channel in A.M.
SC-3	South Creek Outfall from Large Wetland	0.0-0.7	10	Shallow banks, Aquatic Vegetation.
SC-4	South Creek near Honore Avenue	0.7-1.2	8	Rooted Emergents Cover 33% of Channel, Canopy of Pine.
SC-7	South Creek near I-75 Downstream of Dairy	0.4-0.6	9	50% Cover of Rooted Emergents, 75% Upstream Coverage by Floating Aquatics, Willow and Pepper Trees Line Banks.
SC-8	South Creek Upstream of Oscar-Scherer Recreational Area	0.8-1.7	10	Aquatic Vegetation, Incised Banks.

[a]Range in Depth recorded during monitoring period of April, 1987 - March, 1988.
[b]Depths reported are depths at sampling location - total depth at site averages 8.0 feet.

the interior of the North Tract at Stations SC-4 and SC-1, and downstream of the North Tract at Station SC-8.

In Catfish Creek, inflow into the North Tract was monitored at Station CC-1 while outflow was monitored at Station CC-5. Station CC-1 receives drainage from Clark Road, McIntosh Road, and various commercial/industrial developments. Two tributaries of Catfish Creek were also monitored near their confluences with the Trunk Ditch (Stations CC-2 and CC-3). These two stations represent stream segments which receive drainage from the Prestancia development and backwater effects of the Trunk Ditch.

Trunk Ditch was monitored within its realigned segment within the Catfish Creek-Trunk Ditch Drainage Basin at Station CC-4. This site lies adjacent to and receives drainage from both the Country Club of Sarasota and Prestancia and sources farther upstream, as well as the pine flatwoods, improved pastures, and wetlands of the Palmer Ranch. Farther to the South, Trunk Ditch was monitored at a location within the North Creek Basin, i.e. Station NC-6.

Elligraw Bayou was monitored near its point of outflow from the North Tract, i.e. Station EL-1A. Elligraw Bayou receives drainage primarily from marshes, sloughs, and open areas on the Palmer Ranch and from the Prestancia Development.

2.2 Parameters and Sampling Frequency

As the result of an agreement between Palmer Venture and Sarasota County, CCI was directed to resume the Continuing Surface Water Quality Monitoring Program in December, 1989 with a single annual sampling event for the fifth year of monitoring.

The required annual sampling event was performed during December 5 and 6, 1989. Surface water quality monitoring during this event was performed by: (1) the use of field instrumentation and in situ measurements; and, (2) the collection of grab samples followed by laboratory analyses. A digital readout Hydrolab Series 4000 was used for in situ measurements of dissolved oxygen, pH, specific conductance, and water temperature. Prior to deployment in the field, the Hydrolab was calibrated according to the manufacturer's recommended procedures. All in situ measurements were taken at approximately mid-depth at each station except Station CC-4 which was monitored at a depth of approximately 1 foot. Grab samples were collected at each station during the annual event, preserved, and analyzed in the laboratory within the recommended hold times for the parameters listed in Table 2.

All laboratory analyses were performed in accordance with the procedures described in the seventeenth edition of Standard Methods (APHA, 1989) or the Methods for Chemical Analysis of Water and Wastes (USEPA, 1983). Methods used for In situ measurements, sample collection, sample preservation and storage, and laboratory analyses are listed by parameter in Table 2. Laboratory analyses were performed by

TABLE 2. COLLECTION AND ANALYTICAL METHODS USED DURING THE CONTINUING SURFACE WATER QUALITY MONITORING PROGRAM.

Parameter	Sample Type	Field Handling	Hold Time	Laboratory Handling	Analytical Method	Method Reference
Arsenic, Total	Grab	HNO_3 to pH <2, Stored on Ice	6 Months	Stored at Room Temperature	Digestion, Atomic Absorption - Furnace Technique	EPA 206.2
Bacteria, Fecal Coliform	Grab	Stored on Ice	30 Hours	Immediate Analysis	Multiple Tube Fermentation	APHA 9221 C
Bacteria, Total Coliform	Grab	Stored on Ice	30 Hours	Immediate Analysis	Multiple Tube Fermentation	APHA 9221 B
Biochemical Oxygen Demand (BOD-5 Day)	Grab	Stored on Ice	48 Hours	Immediate Analysis	Membrane Electrode	APHA 5210 B
Cadmium, Total	Grab	HNO_3 to pH <2, Stored on Ice	6 Months	Stored at Room Temperature	Digestion/PDCA Extraction, Atomic Absorption	EPA 213.1
Chromium, Total	Grab	HNO_3 to pH <2, Stored on Ice	6 Months	Stored at Room Temperature	Digestion/PDCA Extraction Atomic Absorption	EPA 218.1
Conductivity	In situ	---	---	---	Hydrolab - Wheatstone Bridge	APHA 2510 B
Copper, Total	Grab	HNO_3 to pH <2, Stored on Ice	6 Months	Stored at Room Temperature	Digestion, Atomic Absorption	EPA 220.1
Lead, Total	Grab	HNO_3 to pH <2, Stored on Ice	6 Months	Stored at Room Temperature	Digestion/PDCA Extraction, Atomic Absorption	EPA 239.1
Mercury, Total	Grab	HNO_3 to pH <2, Stored on Ice	28 Days	Stored at 4 °C Temperature	Digestion, Atomic Absorption Cold Vapor Method	EPA 245.1
Nickel, Total	Grab	HNO_3 to pH <2, Stored on Ice	6 Months	Stored at Room Temperature	Digestion, Atomic Absorption	EPA 249.1
Nitrogen, Ammonia	Grab	H_2SO_4 to pH <2, Stored on Ice	28 Days	Stored at 4 °C	Automated Phenate	APHA-NH_3 H
Nitrogen, Nitrate + Nitrite	Grab	H_2SO_4 to pH <2, Stored on Ice	28 Days	Stored at 4 °C	Automated Cadmium Reduction	EPA 353.2
Nitrogen, Nitrite	Grab	Stored on Ice	48 Hours	Stored at 4 °C	Automated Autoanalyzer	EPA 353.2
Nitrogen, Nitrate	Grab	---	---	---	Calculation	EPA 353.2

TABLE 2. COLLECTION AND ANALYTICAL METHODS USED DURING THE CONTINUING SURFACE WATER QUALITY MONITORING PROGRAM (continued).

Parameter	Sample Type	Field Handling	Hold Time	Laboratory Handling	Analytical Method	Method Reference
Nitrogen, Total Kjeldahl	Grab	H_2SO_4 to pH <2, Stored on Ice	28 Days	Stored at 4 °C	Automated Block Digestion, Autoanalyzer	EPA 351.2
Nitrogen, Total	Grab	—	—	—	Calculation	APHA 4500-N
Oil and Grease	Grab	H_2SO_4 to pH <2, Stored on Ice	28 Days	Stored at 4 °C	Gravimetric	EPA 413.1
Oxygen, Dissolved	In situ	—	—	—	Hydrolab - Membrane Electrode	APHA 4500-O G
pH	In situ	—	—	—	Hydrolab - Electrometric	APHA 4500-H
Phosphate, Total Reactive	Grab	Stored on Ice	48 Hours	Immediate Analysis	Automated, Ascorbic Acid	EPA 365.1
Phosphate, Total	Grab	H_2SO_4 to pH <2, Stored on Ice	28 Days	Stored at 4 °C	Automated Block Digestion, Autoanalyzer	EPA 365.4
Solids, Total Suspended (TSS)	Grab	Stored on Ice	7 Days	Stored at 4 °C	Glass Fiber Filtration, Dried at 105 °C	APHA 2540 D
Temperature	In situ	—	—	—	Hydrolab - Thermistor	APHA 2550B
Turbidity (NTU)	Grab	Stored on Ice	48 Hours	Stored at 4 °C	Nephelometric	APHA 2130B
Zinc, Total	Grab	HNO_3 to pH <2, Stored on Ice	6 Months	Stored at Room Temperature	Digestion, Atomic Absorption	EPA 289.1
Pesticides, Organochlorine	Grab	Stored on Ice	7 Days	Stored at 4 °C	Gas Chromatograph	EPA 608
Flow/Direction	In situ	—	—	—	Marsh-McBirney Flow Meter - Electromagnetic Sensor	Manufacturer's Specifications

APHA - American Public Health Association, American Water Works Association and Water Pollution Control Federation, 1989. Standard Methods for the Examination of Water and Wastewater, 17th Edition. American Public Health Association.

EPA - U.S. Environmental Protection Agency, 1983. Methods for Chemical Analysis of Water and Wastes, EPA - 600/4-79-020, National Environmental Research Center, Cincinnati, Ohio.

the CCI laboratory except for the analysis of oils and greases, pesticides, and trace metals which were performed by CCI's State Certified subcontract laboratory. Copies of the data reports provided by the outside laboratory are given in Appendix B.

Two additional parameters were monitored as an aid in evaluating the water quality data although not part of the Continuing Surface Water Quality Monitoring Program. These were stream flow and water depth which were monitored at each sampling point concurrently with water quality monitoring. Stream flow was determined by the use of flow meters with an electromagnetic sensor and water depth was measured at each point of water quality sampling using a fiberglass tape.

2.3 Applicable Water Quality Standards

The segments of the streams traversing the North Tract of the Palmer Ranch are non-tidal freshwater systems which have been designated by the State as Class III waters. State water quality standards specified in Florida Administrative Code 17-3 (FAC 17-3), as well as those given in Sarasota County Code 72-37 which are applicable to the Continuing Water Quality Monitoring Program (i.e. Class III, predominantly fresh waters) are listed in Table 3.

3.0 RESULTS AND DISCUSSION

During the two day period of December 5 and 6, 1989, the fifth annual event of the Continuing Surface Water Quality Monitoring Program was performed at the 13 monitoring station network located in the streams traversing the Palmer Ranch. The

TABLE 3. APPLICABLE STATE AND COUNTY WATER QUALITY CRITERIA FOR CLASS III PREDOMINATELY FRESH WATERS.

Parameter	State of Florida FAC 17-3	Sarasota County Ord. No. 72-37
Arsenic	Not > 0.05 mg/l	Not > 0.01 mg/l
BOD-5	Not to be increased in a manner that would depress Dissolved Oxygen levels below criteria.	Same as FAC 17-3
Cadmium	Not >0.0008 mg/l in predominantly fresh waters with a hardness of less than 150 mg/l of $CaCO_3$. Not to exceed 0.0012 mg/l in harder waters.	Not >0.01 mg/l
Chromium	Not > 0.05 mg/l in predominantly fresh waters	Not > 0.02 mg/l
Coliform, Fecal	Not > 800/100 ml	---
Coliform, Total	Not > 2,400/100 ml	Not > 2,400/100 ml
Conductivity	Shall not be increased more than 50% above background or to 1275 umhos/cm, whichever is greater, in predominantly fresh waters.	+100% above background, or to max. of 500 umhos/cm in fresh water streams.
Copper	Not > 0.03 mg/l	Not > 0.01 mg/l
Dissolved Oxygen	Not < 5 mg/l	Not < 4 mg/l
Lead	Not > 0.03 mg/l	Not > 0.01 mg/l
Mercury	Not > 0.0002 mg/l	Not > 0.01 mg/l
Nickel	Not > 0.1 mg/l	Not > 0.1 mg/l

TABLE 3. APPLICABLE STATE AND COUNTY WATER QUALITY CRITERIA FOR CLASS III PREDOMINATELY FRESH WATERS (continued).

Parameter	State of Florida FAC 17-3	Sarasota County Ord. No. 72-37
Nutrients	Concentrations in a body of water shall not be altered in such a manner as to cause an imbalance in natural populations of aquatic flora or fauna.	-----
Nitrogen, Ammonia (ionic plus non-ionic)	See Nutrients	Only applies to non-ionic Ammonia
Nitrogen, Nitrite	See Nutrients	-----
Nitrogen, Nitrate	See Nutrients	-----
Nitrogen, Total	See Nutrients	-----
Nitrogen, Organic	See Nutrients	-----
Oil and Greases	Not > 5 mg/l	Not > 15 mg/l
Phosphate, Ortho	See Nutrients	-----
Phosphate, Total	See Nutrients	-----
pH	6 - 8.5	6 - 8.5
Solids, Total Suspended	-----	-----
Turbidity	Not > 29 NTU above background	Not > 25 JTU above background
Zinc, as Zn	Not > 0.03 mg/l	Not > 0.01 mg/l

TABLE 3. APPLICABLE STATE AND COUNTY WATER QUALITY CRITERIA FOR CLASS III PREDOMINATELY FRESH WATERS (continued).

Parameter	State of Florida FAC 17-3	Sarasota County Ord. No. 72-37
Aldrin plus Dieldrin	Not > 0.003 ug/l	-----
alpha - BHC	-----	-----
beta - BHC	-----	-----
delta - BHC	-----	-----
gamma - BHC (Lindane)	Not > 0.01 ug/l	-----
Chlordane	Not > 0.01 ug/l	-----
4,4' DDD	-----	-----
4,4'-DDE	-----	-----
4,4'-DDT	Not > 0.001 ug/l	-----
Endosulfan	Not > 0.003 ug/l	-----
Endrin	Not > 0.004 ug/l	-----
Heptachlor	Not > 0.001 ug/l	-----
Toxaphene	Not > 0.005 ug/l	-----
Polychlorinated Biphenyls	Not > 0.001 ug/l	-----

locations of the monitoring stations are shown on Figure 2. On December 5, 1989 the monitoring stations located in the Catfish Creek - Trunk Ditch Drainage Basin were sampled with the monitoring stations in the South Creek Basin being sampled the following day. The results of the December, 1989 annual event are provided in Table 4.

Due to the abnormally dry conditions which preceded the December, 1989 sampling event, the stream flows and water depths measured at the 13 monitoring stations were generally below those previously recorded. Stream flows ranged from 0 to 387 gpm with six of the 13 stations (i.e. stations CC-1, CC-2, CC-3, EL-1A, SC-1, and SC-2) exhibiting no flow conditions. The greatest flow (397 gpm) was observed downstream of the property boundary in South Creek at Station SC-8. The greatest flow in the Catfish Creek - Trunk Ditch Basin was observed at the downstream property boundary at Station CC-5 where a flow rate of 247 gpm was recorded. Water depths at the 13 monitoring stations ranged from 0.30 to 1.25 feet. It should be noted that the reported water depths were determined at the site in which the In situ measurements were made and do not represent the maximum water depth at all stations.

As observed during the previous four years of monitoring, both total and fecal coliform bacteria counts determined from the December, 1989 monitoring event were frequently out of compliance with State and County standards. In the Catfish Creek - Trunk Ditch Basin the highest bacteria levels were found for the two northern most stations (i.e. CC-1 and CC-2) with bacteria counts in the basin ranging from 13 to 2400 MPN/100 ml for fecal coliform and from 500 to 5000 MPN/100 ml for total coliform bacteria.

TABLE 4. RESULTS OF IN SITU MEASUREMENTS AND CHEMICAL ANALYSES OF WATER QUALITY SAMPLES COLLECTED ON THE PALMER RANCH ON DECEMBER 5 AND DECEMBER 6, 1989.

Parameter	Station													State Standard[a]
	CC-1	CC-2	CC-3	CC-4	CC-5	EL-1A	NC-6	SC-3	SC-4	SC-7	SC-1	SC-2	SC-8	
Bacteria, Fecal Coliform (MPN/100 ml)	2400*	2400*	170	13	70	50	500	1300*	500	1400*	600	700	300	≤800
Bacteria, Total Coliform (MPN/100 ml)	5000*	3000*	1700	500	500	1400	1300	1300	1300	5000*	600	1100	300	≤2400
Biochemical Oxygen Demand (BOD-5 Day) (mg/l)	1.5	1.8	0.6	1.5	1.1	3.6	1.8	1.9	0.7	1.3	0.9	1.1	1.1	—
Conductivity (umhos/cm)	777*	1416*	1235*	881*	954*	1007*	658*	859*	1683*	996*	994*	979*	910*	≤1275
Water Depth (ft)	1.25	0.42	0.65	0.35	0.30	0.72	0.55	0.55	0.75	0.30	0.70	0.37	0.71	—
Stream Flow (GPM)	0	0	0	88.4	246.9	0	38.1	26.5	146.8	25.6	0	0	386.9	—
Oxygen, Dissolved (mg/l)	6.5	8.6	3.9*	8.8	10.5	8.8	1.5*	4.1*	8.8	4.2*	6.9	7.0	9.0	≥5.0
Nitrogen, Ammonia (mg/l)	0.07	<0.02	0.05	<0.02	<0.02	<0.02	0.09	0.02	<0.02	0.13	0.03	<0.02	<0.02	—
Nitrogen, Nitrate (mg/l)	0.28	<0.01	0.25	0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.14	<0.01	<0.01	<0.01	—
Nitrogen, Nitrite (mg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	—
Nitrogen, Total Kjeldahl (mg/l)	0.61	1.52	0.79	0.89	0.87	1.72	1.09	1.55	0.91	1.78	1.32	1.55	0.83	—
Nitrogen, Organic (mg/l)	0.54	1.52	0.74	0.89	0.87	1.72	1.00	1.53	0.91	1.65	1.29	1.55	0.83	—
Nitrogen, Total (mg/l)	0.89	1.52	1.04	0.90	0.87	1.72	1.09	1.55	0.93	1.92	1.32	1.17	0.83	—
pH (pH units)	6.9	7.2	6.9	7.1	7.8	7.2	7.1	6.9	7.3	7.0	7.2	7.3	6.7	6.0-8.5
Phosphate, Total Reactive (mg/l)	0.09	0.01	0.01	<0.01	<0.01	<0.01	0.03	0.05	0.07	0.20	0.06	0.05	0.01	—
Phosphate, Total (mg/l)	0.14	0.17	0.01	0.20	0.07	0.18	0.12	0.09	0.12	0.31	0.07	0.08	0.16	—
Solids, Total Suspended (mg/l)	4.0	6.0	8.0	7.0	5.0	9.0	5.0	4.0	4.0	13.0	3.0	4.0	2.0	—
Temperature (°C)	12.1	17.2	16.4	17.2	23.0	14.4	13.2	15.4	15.9	13.8	15.6	15.4	15.8	—
Turbidity (NTU)	3.2	2.6	9.4	7.0	3.0	12.0	3.2	1.0	1.5	6.0	2.1	2.0	2.5	≤29 above background
Arsenic, Total (mg/l)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.011*	0.005	<0.005	0.008	0.006	<0.005	≤0.05
Cadmium, Total (ug/l)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	≤0.8
Chromium, Total (mg/l)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	≤0.05
Copper, Total (mg/l)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	≤0.03
Lead, Total (mg/l)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	≤0.03
Mercury, Total (ug/l)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	≤0.2
Nickel, Total (mg/l)	0.007	0.007	0.006	<0.005	<0.005	<0.005	<0.005	0.006	0.009	0.008	<0.005	0.005	0.009	≤0.1
Zinc, Total (mg/l)	0.047*	0.032*	0.014*	0.012*	0.011*	0.014*	0.009	0.008	0.006	0.009	0.025*	0.006	0.020*	≤0.03
Oil and Grease mg/l)	2.8	2.9	3.1	3.1	3.6	3.3	3.9	<1.0	<1.0	<1.0	4.0	2.4	3.2	≤5.0

*Non-compliance with State or Sarasota County Standards.

[a]State standards as specified in Florida Administrative Code 17-3, Class III predominately fresh water.

[b]Sarasota County Standards for parameters exhibiting non-compliance conditions.

Fecal Coliform Bacteria - ≤800 MPN/100 ml
Total Coliform Bacteria - ≤2400 MPN/100 ml
Dissolved Oxygen - ≥4.0 mg/l
Arsenic - ≤0.010 mg/l
Zinc - ≤0.010 mg/l

TABLE 4. RESULTS OF IN SITU MEASUREMENTS AND CHEMICAL ANALYSES OF WATER QUALITY SAMPLES COLLECTED ON THE PALMER RANCH ON DECEMBER 5 AND DECEMBER 6, 1989 (continued).

Parameter	Station													State Standard[a]
	CC-1	CC-2	CC-3	CC-4	CC-5	EL-1A	NC-6	SC-3	SC-4	SC-7	SC-1	SC-2	SC-8	
4,4'-DDD (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	—
4,4'-DDE (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	—
4,4'-DDT (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	—
Aldrin (ug/l)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	≤0.03
alpha-BHC (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	—
beta-BHC (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	—
delta-BHC (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	—
gamma-BHC (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	—
Chlordane (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.01
Dieldrin (ug/l)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	≤0.003
Endosulfan I (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.003
Endosulfan II (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.003
Endosulfan Sulfate (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.003
Endrin (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.004
Endrin Aldehyde (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.004
Heptachlor (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.001
Heptachlor Epoxide (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.001
Methoxychlor (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.03
Toxaphene (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.005
PCB 1016 (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.001
PCB 1221 (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.001
PCB 1232 (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.001
PCB 1242 (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.001
PCB 1248 (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.001
PCB 1254 (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.001
PCB 1260 (ug/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	≤0.001

[a]State standards specified in Florida Administrative Code 17-3, Class III predominately fresh water.

Both Stations CC-1 and C-2 exceeded the 2400 and 5000 MPN/100 ml State and County criteria for fecal and total coliform bacteria, respectively. Similarly, in the South Creek Basin the fecal coliform bacteria levels ranged from 300 to 1400 MPN/100 ml and total coliform bacteria ranged from 300 to 5000 MPN/100 ml with the highest bacteria counts being found near the property boundaries at Stations SC-3 and SC-7. Both Stations SC-3 and SC-7 exceeded the State and County standard for fecal coliform bacteria but, only Station SC-7 was found to be in violation of the total coliform standard. The high bacteria levels found probably originate from natural occurring sources located upstream and within the Palmer Ranch property. Probable sources of the bacteria including warm blooded animals inhabiting the watershed such as birds, cattle, feral hogs, deer, rodents, and other small mammals; and total coliform bacteria associated with soils and vegetation.

The overall levels of nutrients determined for the December, 1989 sampling event were significantly lower than those observed during the past monitoring events. The lower nutrient levels probably are the result of the drought conditions experienced prior to the monitoring event and the subsequent lack of stormwater runoff.

The highest levels of ammonia, nitrate, total Kjeldahl nitrogen, total nitrogen, total reactive phosphate, and total phosphate were generally found at Stations SC-7 and CC-1, both of which are near upstream property boundaries. The levels of these nutrients showed gradual downstream declines. This indicates the presence of upstream sources of nutrients which are entering the Palmer Ranch. The same

conclusion has been reached from data collected during the previous four years of monitoring. The potential upstream sources of nutrients include a dairy farm which was changed to a sod farm in August 1987, a golf course, and mobile home park located in the South Creek Basin. In the Catfish Creek-Trunk Ditch Basin, nutrients are subject to being transported onto the Ranch by surface runoff originating in the commercial-industrial strip development along Clark Road and the country club development located in the western part of the basin.

The highest levels of organic nitrogen and BOD as well as a relatively high level of total phosphate were recorded for the Elligraw Bayou station (i.e. Station EL-1A). The high nitrogen, phosphate, and BOD levels at Station EL-1A have been reported in the past and are attributable to the combined effects of stormwater loading, low stream flow, and the accumulation and decay of vegetation.

During the past four years, nitrite and nitrate concentrations have generally represented the smallest fractions of the constituents making up total nitrogen. Such conditions were also observed for the December, 1989 sampling event. As shown in the results, nitrite was 0.01 mg/l (as N) or less at all stations with nitrate being 0.01 mg/l (as N) or less at 10 of the 13 monitoring stations. Stations CC-1, CC-3, and SC-7 exhibited the highest nitrate levels of 0.28, 0.25, and 0.14 mg/l (as N), respectively. The low overall levels of nitrite and nitrate are attributed to a combination of low import rates of these nitrogen forms and a preference by the primary producers for nitrate compared to other forms of nitrogen.

Dissolved oxygen and pH levels determined during the December, 1989 sampling event are typical of those observed for the streams on Palmer Ranch in recent years with the levels of BOD generally being below previously reported values. The pH ranged from 6.7 for Station SC-8 to 7.8 for Station CC-5 with all stations being in compliance with State and County standards. Dissolved oxygen levels averaged 6.8 mg/l and ranged from 1.5 to 9.0 mg/l. Four of the 13 stations (i.e. Stations CC-3, NC-6, SC-3, and SC-7) were found to be in violation of the State standard of not less than 5 mg/l with only two stations (i.e. Station CC-3 and NC-6) being in violation of the less stringent Sarasota County standard of not less than 4 mg/l. Biochemical oxygen demands (BODs) averaged 1.45 mg/l and ranged from 0.6 to 3.6 mg/l for Stations CC-3 and EL-1A, respectively. These levels are significantly below the 3 - 4 mg/l average BOD levels reported in previous years.

Levels of total suspended solids and turbidity were within the normal ranges observed during the past four years of monitoring with the highest values recorded for Stations CC-3, EL-1A, and SC-7. At Station EL-1A the accumulation of organic matter and algal growth was most likely the cause for these elevated levels, while at Stations CC-3 and SC-7, the high suspended solids and turbidity are attributed to particulate matter.

The concentrations of oils and greases were determined to range from <1 to 4.0 mg/l, and therefore, all stations were in compliance with applicable water quality standards. Such levels are typical of those determined for the streams on the Palmer Ranch in the past.

Results of pesticide scans showed less than detectable levels of all of the PCBs and organochlorine pesticides analyzed including: aldrin, chlordane, DDT, dieldrin, endosulfan, endrin, heptachlor, and toxaphene. Therefore all stations were in compliance with State and County standards regarding these parameters.

Field measurements of specific conductance made during the December, 1989 sampling event ranged from 658 to 1683 umhos/cm. This range in specific conductivity is slightly above normal for the streams of the ranch. Two of the 13 stations (i.e. Stations CC-2 and SC-4) exceeded the 1275 umhos/cm allowable limit for Class III predominantly freshwater according to FAC 17-3. The conductivity at all 13 stations exceeded the strict Sarasota County standard of 500 umhos/cm. The reason for the elevated conductivity levels is probably the drought conditions experienced prior to the sampling event and the associated lack of low conductivity stormwater entering the streams. In addition, a greater proportion of the stream's surface waters probably originated from the exfiltration of higher conductivity groundwater.

Of the eight trace metals measured for the samples collected during the December, 1989 sampling event, six (cadmium, chromium, copper, lead, mercury, and nickel) were found at concentrations below State and County criteria at all 13 monitoring stations. Except for nickel, these trace metals were at concentrations below detection limits at all stations with nickel being below detection limits at five of the 13 stations.

The only exceedences of the trace metal standards were for arsenic and zinc. Zinc was in compliance with the 0.03 mg/l state criteria specified in FAC 17-3 at 11 of the

13 stations with the only exceedences occurring in the Catfish Creek Basin at the two northern most stations (i.e. Stations CC-1 and CC-2). Violations of the County's more stringent 0.01 mg/l standard were found at all stations in the Catfish Creek - Trunk Ditch Basin, except at Station NC-6 and at Stations SC-1 and SC-8 in the South Creek Basin. Zinc is a natural constituent in surface waters and an essential element for living organisms. In addition, various anthropogenic sources of zinc exist in the area including bulk fallout and road runoff. Importantly, the highest concentration of zinc was found at Station CC-1, which is located at the northern property boundary, with the zinc concentration progressively decreasing downstream of that station in the Catfish Creek - Trunk Ditch Basin. Therefore, the zinc most likely originates from natural and/or anthropogenic source(s) located upstream of the Palmer Ranch.

The arsenic concentration was in compliance with the state standard of 0.05 mg/l at all 13 monitoring stations during the December, 1989 monitoring event. However, Station SC-3 exhibited a arsenic level of 0.011 mg/l, and therefore, was slightly out of compliance with the County's more stringent standard of 0.01 mg/l. Arsenic is not considered an essential element for living organisms but is subject to bioacculumation and may have toxic effects at higher concentrations. Sources of arsenic include both natural and anthropogenic sources. In nature, arsenic occurs in soils and may occur naturally in association with phosphate deposits which occur in this region of Florida. On the other hand, arsenic may originate from the use of certain herbicides or from a diversity of industrial uses. Therefore, this exceedence is attributed to a combination of natural and/or anthropogenic sources on and surrounding the ranch.

APPENDIX A. CONTRACT LABORATORY REPORTS

Envirolab, Inc.
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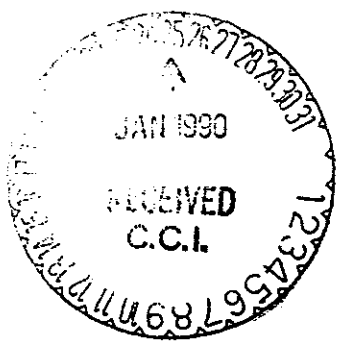

CONSERVATION CONSULTANTS, INC

P.O.BOX 35
PALMETTO FL 33561
ATTN: GARY PAYNE

Description: 13 WATER SAMPLES Samples Received on 12/07/89

Sampled By: CLIENT Client Job/PO Number:

Reference Number: 895034 Reported Date : 01/09/90
Invoice Number: 89-5034

Sample	Description	Client Id
0001	346-06411	SC-1
0002	346-06412	SC-2
0003	346-06413	SC-3
0004	346-06414	SC-4
0005	346-06415	SC-7
0006	346-06416	SC-8
0007	346-06376	CC-1
0008	346-06377	CC-2
0009	346-06378	CC-3
0010	346-06379	CC-4
0011	346-06380	CC-5
0012	346-06381	EL-1A
0013	346-06382	NC-6

PARAMETER		SAMPLE NUMBER 0001	0002	0003	0004	0005	0006	0007	0008
ARSENIC	MG/L	0.008	0.006	0.011	0.005	< 0.005	< 0.005	< 0.005	< 0.005
CADMIUM.	MG/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
CHROMIUM	MG/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
COPPER.	MG/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
LEAD.	MG/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
MERCURY.	MG/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
NICKEL	MG/L	< 0.005	0.005	0.006	0.009	0.008	0.009	0.007	0.007

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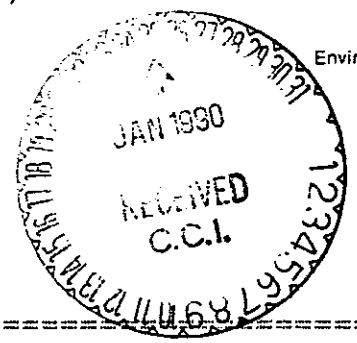

Reference Number: 895034 Page: 2

PARAMETER		SAMPLE NUMBER 0001	0002	0003	0004	0005	0006	0007	0008
IL AND GREASE	MG/L	4.0	2.4	< 1	< 1	< 1	3.2	2.8	2.9
INC	MG/L	0.025	0.006	0.008	0.006	0.009	0.020	0.047	0.032
PROFILE: CLASS III 608.									
4,4'-DDE	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
4,4'-DDT	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
4-4'-DDD	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
A-BHC	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
ALDRIN	UG/L	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
B-BHC	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
CHLORDANE	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
D-BHC	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
DIELDRIN	UG/L	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
ENDOSULFAN I	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
ENDOSULFAN II	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
ENDOSULFAN SULFATE	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
ENDRIN	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
ENDRIN ALDEHYDE	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
G-BHC	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
HEPTACHLOR	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
HEPTACHLOR EPOXIDE	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
METHOXYCHLOR	UG/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
PCB 1016	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB 1221	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB 1232	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB 1242	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB 1248	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB 1254	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB 1260	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TOXAPHENE	UG/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

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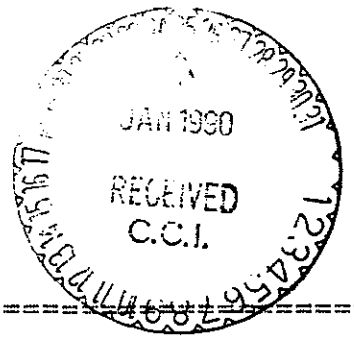

Reference Number: 895034 Page: 3

PARAMETER		SAMPLE NUMBER 0009	0010	0011	0012	0013
RSENIC	MG/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
ADMIUM.	MG/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
CHROMIUM	MG/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
OPPER.	MG/L	< 0.005	< 0.005	< 0.005	0.009	< 0.005
EAD.	MG/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
ERCURY.	MG/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
NICKEL	MG/L	0.006	< 0.005	< 0.005	< 0.005	< 0.005
IL AND GREASE	MG/L	3.1	3.1	3.6	3.3	3.9
INC	MG/L	0.014	0.012	0.011	0.014	0.009
OFILE: CLASS III 608.						
4,4'-DDE	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
4,4'-DDT	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
4-4'-DDD	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
A-BHC	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
ALDRIN	UG/L	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
B-BHC	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
CHLORDANE	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
D-BHC	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
DIELDRIN	UG/L	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
ENDOSULFAN I	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
ENDOSULFAN II	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
ENDOSULFAN SULFATE	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
ENDRIN	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
ENDRIN ALDEHYDE	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
G-BHC	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
HEPTACHLOR	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
HEPTACHLOR EPOXIDE	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
METHOXYCHLOR	UG/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
PCB 1016	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB 1221	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB 1232	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB 1242	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

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Reference Number: 895034 Page: 4

PARAMETER		SAMPLE NUMBER 0009	0010	0011	0012	0013
PCB 1248	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB 1254	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PCB 1260	UG/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TOXAPHENE	UG/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

APPROVED BY:

MICHAEL C. PRICE
LABORATORY MANAGER